



MC-02-1079

December 15, 2003

To: Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572  
28 Davis Avenue  
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Subject: | Serial No. 10/666,354 09/19/03 |

Hui Lin Chang et al.

TWO STEP POST-DEPOSITION TREATMENT  
OF ILD LAYER FOR A LOWER DIELECTRIC  
CONSTANT AND IMPROVED MECHANICAL  
PROPERTIES

#### INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation  
In An Application.

The following Patents and/or Publications are submitted to  
comply with the duty of disclosure under CFR 1.97-1.99 and  
37 CFR 1.56.

#### CERTIFICATE OF MAILING

I hereby certify that this correspondence is being  
deposited with the United States Postal Service as first class  
mail in an envelope addressed to: Commissioner for Patents,  
P.O. Box 1450, Alexandria, VA 22313-1450, on December 19, 2003.

Stephen B. Ackerman Reg.# 37761

Signature/Date

 12/19/03

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MA U.S. Patent 6,465,372 to Xia et al., "Surface Treatment of C-Doped SiO<sub>2</sub>, Film to Enhance Film Stability During O<sub>2</sub> Ashing," discusses methods for densifying low k dielectric layers including a plasma treatment with N<sub>2</sub> and He.

MA U.S. Patent 6,403,464 to Chang, "Method to Reduce the Moisture Content in an Organic Low Dielectric Constant Material," provides a method for removing moisture from a low k dielectric layer and is a high density nitrogen plasma treatment at a temperature of from 350 to 450 degrees C.

MA U.S. Patent 6,028,015 to Wang et al., "Process for Treating Damaged Surfaces of Low Dielectric Constant Organo Silicon Oxide Insulation Material to Inhibit Moisture Absorption," discloses a stabilization approach which treats a low k dielectric layer with H<sub>2</sub> plasma.

MA U.S. Patent 6,436,808 to Ngo et al., "NH<sub>3</sub>/N<sub>2</sub>-Plasma Treatment to Prevent Organic ILD Degradation," employs a NH<sub>3</sub>/H<sub>2</sub> plasma treatment of an ILD layer such as SiCOH that is repeated one or more times during a damascene process.

U.S. Patent 6,103,601 to Lee et al., "Method and Apparatus for Improving Film Stability of Halogen-Doped Silicon Oxide Films," discusses a fluorine doped SiO<sub>2</sub> layer treated with hydrogen plasma.

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U.S. Patent 6,372,301 to Narasimhan et al., "Method of Improving Adhesion of Diffusion Layers on Fluorinated Silicon Dioxide," discloses a hydrogen plasma treatment of a fluorinated SiO<sub>2</sub> layer.

U.S. Patent 6,346,488 to Kabansky, "Process to Provide Enhanced Resistance to Cracking and to Further Reduce the Dielectric Constant of a Low Dielectric Constant Dielectric Film of an Integrated Circuit Structure by Implantation with Hydrogen Ions," discloses a hydrogen ion implant to inhibit cracking in a low k film performed with a plasma immersion ion implantation.

U.S. Patent 6,204,204 to Paranjpe et al., "Method and Apparatus for Depositing Tantalum-Based Thin Films with Organometallic Precursor," describes a plasma treatment with Ar/H<sub>2</sub>.

U.S. Patent 6,528,423 to Catabay et al., "Process for Forming Composite of Barrier Layers of Dielectric Material to Inhibit Migration of Copper from Copper Metal Interconnect of Integrated Circuit Structure into Adjacent Layer of Low K Dielectric Material," discloses a plasma treatment which improves resistance in a SiC barrier layer to Cu migration.

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Patent Application TSMC-02-520, Serial No. 10/421,187,  
filing date 04/23/03, assigned to a common assignee, "Solution  
MA for FSG Induced Metal Corrosion & Metal Peeling Defects with  
Extra Bias Liner and Smooth RF Bias Ramp Up," discusses an  
integrated circuit device.

Sincerely,



Stephen B. Ackerman, Reg. #37761

/Maki Angadi/

05/26/2006